

**BY ORDER OF THE COMMANDER  
CANNON AIR FORCE BASE(AFSOC)**

**CANNON AIR FORCE BASE PAMPHLET  
48-151**



**23 OCTOBER 2013**

***Aerospace Medicine***

***PREVENTION OF THERMAL STRESS***

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(Col Jeffrey C. Gillen)

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This pamphlet implements AFPAM 48-151, *Thermal Injury*, 18 November 2002, and establishes policies and procedures for Cannon AFB. It provides guidance for commanders and supervisors to prevent heat and cold stress related injuries at Cannon AFB, NM. It applies to maintenance crews and other personnel working on the flightline or outdoors and does NOT apply to aircrew personnel. This instruction takes into account that heavy winter clothing is available and worn by personnel who are subject to working outdoors. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, Management of Records, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS) located at <https://www.my.af.mil/afirms/afirms/afirms/rims.cfm>. Additionally, if the publication generates a report(s), alert readers in a statement and cite all applicable Reports Control Numbers in accordance with AFI 33-324. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, Recommendation for Change of Publication; route AF Form 847s from the field through the appropriate functional chain of command.

## 1. ROLES AND RESPONSIBILITIES.

1.1. **27th Special Operations Wing Commander** (27 SOW/CC) will enforce base compliance with this program to ensure the health and safety of all personnel on Cannon AFB.

1.2. **27th Special Operations Medical Group Commander** (27 SOMDG/CC) will be the final authority for thermal stress conditions for release to Cannon AFB Notices to Airmen (NOTAMS).

1.3. **27 SOAMDS/SGPB, Bioenvironmental Engineering** (BE) will:

1.3.1. Ensure heat stress guidance is available to shop personnel through Air Force Occupational Safety and Health (AFOSH) inspections at the shop level.

1.3.2. Ensure the WBGT instrument is calibrated and available for daily use from 1 April to 1 October. The WBGT instrument will be deployed during normal duty hours Monday through Friday (except holidays or wing down days) when the ambient temperature is forecast to reach or exceed 85°F and in support of exercises at the request of commanders.

1.3.3. Determine the heat category and flag color in accordance with Tables A2.1. and A2.2. and report this information to the 27 SOW Command Post as changes occur. Because the available guidance was developed according to the wear of the hot weather BDU, one degree will be added to the WBGT reading at all times to account for normal ABU wear. The hot weather ABU is now available and will reduce heat exposure. Because not all Airmen wear the hot weather ABU, BE will make the assumption that all personnel are wearing the normal ABU.

1.3.4. Investigate all thermal stress illnesses documented through the Air Force Safety Automated System (AFSAS).

1.3.5. Ensure wind chill guidance is provided to shop personnel through AFOSH inspections at the shop level.

1.3.6. During winter months, BE personnel will obtain outside ground temperature and wind speed from the installation weather office, determine the Wind Chill Temperature and Frostbite Risk Level and will notify the installation Command Post (784-2253) of the resulting Frostbite Risk Level. (Note: BE only notifies Command Post if a risk may be present or occur).

1.4. **27 SOAMDS/SGPM, Public Health** will:

1.4.1. Provide thermal stress education and training on preventing and controlling heat induced illness and cold injuries, when requested.

1.4.2. Track all thermal stress illnesses through AFSAS and report event to AFRESS II. **NOTE:** IAW AFI 33-332, *Air Force Privacy and Civil Liberties Program*, records retrieved by name or personal identifier are subject to Privacy Act requirements.

1.5. **27 SOW/CP, Command Post** will:

1.5.1. Relay and post the heat category and flag color to 27 SOW organizational commanders through appropriate means.

1.5.2. Relay and post the frostbite risk levels to 27 SOW organizational commanders through appropriate means.

1.6. **27 SOSS/OSW, Weather** will provide weather forecasts, current weather conditions and wind conditions via SharePoint at the following link: <https://eis.afsoc.af.mil/sites/27SOSS/OSW/5day/default.aspx>

1.7. **27 SOW/PA, Public Affairs** will:

1.7.1. Publicize the heat category and flag color through appropriate means.

1.7.2. Publicize the frostbite risk levels through appropriate means.

1.8. **27 SOW Organizational Commanders** (Group/Squadron/Flight Commanders) will:

1.8.1. Ensure that heat stress programs are implemented throughout their organizations.

1.8.2. Ensure wind chill guidance is implemented throughout the organization.

1.9. **Unit Fitness Leaders** will:

1.9.1. Determine whether physical training (PT) can be conducted outside during current weather conditions. Physical training leaders (PTLs) should consider conducting PT indoors when severe environmental conditions exist. Refer to AFI 36-2905, *Fitness Program*, Attachment 8, for environmental conditions required for PT testing. PT should not be conducted outside under the following conditions:

1.9.1.1. Limited visibility due to heavy precipitation/fog.

1.9.1.2. Temperature reading less than 20°F.

1.9.1.3. Wind speed greater than 20 mph.

1.9.1.4. Visibility less than  $\frac{3}{4}$  miles if crossing or running beside vehicular traffic.

1.9.1.5. Lightning within 6 miles, or less than 30 minutes after the last observed lightning.

1.9.1.6. Significant rain (accumulation <0.5 inch/hour).

1.9.1.7. Hail forecasted or reported within 25 miles.

1.9.1.8. WBGT greater than 85°F or the heat index greater than 99°F when WBGT is not available.

1.10. **Shop supervisors** will:

1.10.1. Routinely retrieve the thermal stress index from Command Post, and implement thermal stress safety procedures at shop level per Tables A2.1. and A2.2. Work center supervisors may have to adjust the work-rest cycles for operations that require heavy personal protective equipment.

1.10.2. Ensure all employees are trained to recognize thermal stress disorders and administer first aid treatment according to AFPAM 48-151, *Thermal Injury*.

1.10.3. Ensure employees are acclimatized in accordance AFPAM 48-151.

1.10.4. Monitor weather information, especially for evening and night shift personnel, and implement precautions and work/rest cycles at the shop level per Table A2.1.

1.10.5. Ensure workers wear cold protective clothing appropriate for the level of cold and physical activity at temperatures below 40°F.

1.10.6. Ensure gloves are worn or metal handles are covered with an insulating material when the ambient temperature is 30°F or less.

1.10.7. If heavy work is done (shoveling, etc.) encourage workers to change into dry clothing prior to re-entering a cold environment or going into a cold environment.

1.10.8. Ensure workers handling evaporative liquids such as gasoline, alcohol or cleaning fluids at temperatures below 40°F take special precautions to avoid soaking clothes or gloves due to evaporative cooling of the liquids.

1.10.9. Brief shop personnel during fall and winter safety meetings on wind chill factors and follow the guidance provided in Tables A3.1., A3.2. A3.3. and A4.2.

1.10.10. If a worker becomes immersed in water or their clothing becomes wet, encourage him/her to change clothing immediately and seek treatment for hypothermia.

1.10.11. Report all thermal stress illnesses/injuries to 27 SOMDG/SGP at DSN 681-7801 during duty hours and contact the on-call Flight Surgeon's Office after duty hours (contact through the Command Post).

**1.11. Work center employees will:**

1.11.1. Understand the signs and symptoms of thermal stress, and the associated first aid treatments.

1.11.2. Report all thermal stress illnesses to the work center's supervisor.

**2. MONITORING HEAT STRESS.**

2.1. BE will routinely monitor heat stress index during the summer months. The summer monitoring period will begin around Memorial Day and end around Labor Day. The summer monitoring period may be increased or decreased based on seasonal variations.

2.2. When the predicted or forecasted outside temperatures reach 85°F as a daily high, BE will perform heat stress monitoring at least four times during the hottest part of the day. Examples of monitoring schedules might be 1000, 1200, 1400, and 1600 or 0900, 1100, 1300, and 1500. The heat category is determined by the Wet Bulb Globe Temperature (WBGT) Index. The WBGT Index is NOT related to typical civilian "heat indexes." The WBGT Index is a combination of measurements, which take into account dry air temperature, relative humidity, and radiant heating. The Bioenvironmental Engineer has the field apparatus necessary to determine the WBGT Index.

2.3. When the WBGT reaches 85°F, BE will initiate heat stress monitoring hourly during normal duty hours. Tables A2.1. and A2.2. provide the Heat Categories, their corresponding WBGT Index range with corresponding color category, the recommended work/rest cycles (in minutes) and fluid intake guidelines. The recommended work/rest guidelines are established to prevent adverse heat-related health effects, and represent conditions under which it is believed that nearly all un-medicated, healthy workers may be repeatedly exposed

without adverse health effects. The recommendations should not be used as a fine line between safe and dangerous levels, but should be used with good judgment concerning the working conditions and the individuals to ensure adequate protection for each situation. Table A2.3. provides examples of light, moderate, and heavy work referenced in Table A2.1.

2.4. Bioenvironmental Engineering notifies the Command Post (784-2253) of the heat stress condition/flag conditions determined by the WBGT index. (Note: BE only notifies Command Post when flag conditions change.)

2.5. The Command Post notifies Security Forces, Fire Department, Sports and Fitness Center, Maintenance Operations Control Center (MOCC), Cannon & Ranchvale Child Development Centers, Youth Center, Civil Engineering, Golf Course, Safety, and Public Affairs when flag conditions change.

2.6. Public Affairs will update flag conditions on the base webpage, Facebook page, and other appropriate means.

2.7. MOCC does an ALL-CALL and notifies all the maintenance production superintendents, Telford Aviation, Sierra Nevada, and Battle Space.

2.8. Supervisor Actions:

2.8.1. Supervisors should follow the guidelines in Table A4.1. if personnel show signs and/or symptoms of heat stress.

2.8.2. Supervisors should be proactive with their work environment and work practices in order to help minimize the risk of heat stress.

2.8.2.1. Engineering Controls: Engineering controls should be implemented as a first line of defense against heat stress. This will reduce the amount of heat to which an individual is exposed.

2.8.2.1.1. General ventilation such as fans to move cool air around to produce convection can be installed.

2.8.2.1.2. Evaporative cooling machines can be used outside to cool personnel working on the flightline and other outdoor locations.

2.8.2.1.3. Air conditioning should be used to cool indoor work areas.

2.8.2.1.4. Establish cool rooms and shaded areas to allow workers a place to take breaks.

2.8.2.1.5. Use power tools when possible to reduce manual labor.

2.8.2.2. Work Practices: When personnel have to work in hot environments, supervisors must implement work practices to prevent heat stress disorders.

2.8.2.2.1. Use the work/rest cycles and fluid intake recommendations in Tables A2.1. & A2.2.

2.8.2.2.2. Ensure personnel are trained to recognize and treat heat disorders and the actions to take in case of an emergency (see Table A.4.1).

2.8.2.2.3. Organizations should schedule heavier workloads during cooler parts of the day, i.e., night or early morning.

2.8.2.2.4. Personnel should pace themselves and try not to finish the work at a rapid pace.

2.8.2.2.5. Assign extra workers to jobs if there are time constraints. Use relief workers to give individuals enough rest time. Personnel on medication or medical waiver may require additional rest periods because they are at greater risk for heat stress.

### **3. MONITORING COLD STRESS.**

3.1. The base weather office will post current weather conditions and forecasted weather conditions to include wind speed on SharePoint.

3.2. During winter months, BE personnel will obtain outside ground temperature and wind speed from the installation weather office three times per week (Monday, Wednesday and Friday) at the end of the duty day. BE personnel will then determine the Wind Chill Temperature and Frostbite Risk Level (FRL) using Figure A3.1.

3.3. BE will notify the installation Command Post (784-2253) of the resulting FRL. (Note: BE only notifies Command Post if a risk may be present or occur)

3.4. The Command Post will notify Security Forces, Fire Department, Sports and Fitness Center, MOCC, Cannon & Ranchvale Child Development Centers, Youth Center, Civil Engineering, Golf Course, Public Affairs, and Safety when frostbite risks change.

3.5. Public Affairs will update frostbite conditions on the base webpage, Facebook page, and other appropriate means.

3.6. MOCC does an ALL-CALL and notifies all the maintenance production superintendents, Telford Aviation, Sierra Nevada, and Battle Space.

3.7. Supervisor Actions:

3.7.1. Supervisors should follow the guidelines in Table A3.3. if frostbite risks exist and Table A4.2. if personnel show signs and/or symptoms of cold injuries.

3.7.2. Supervisors should be proactive with their work environment and work practices in order to help minimize the risk of cold stress.

3.7.2.1. Engineering Controls: Engineering controls should be implemented as a first line of defense against cold stress. This will reduce the degree of individual exposure.

3.7.2.1.1. Heating systems and approved space heaters can be used to heat personnel.

3.7.2.1.2. Establish warm rooms to allow workers a place to take breaks.

3.7.2.2. Work Practices: When personnel have to work in cold environments, supervisors must implement work practices to prevent cold stress disorders.

3.7.2.2.1. Use the work/rest cycles in Figure A3.2.

3.7.2.2.2. Ensure personnel are trained to recognize and treat cold disorders and the actions to take in case of an emergency.

3.7.2.2.3. Organizations should schedule heavier workloads during warmer parts

of the day.

3.7.2.2.4. Personnel should pace themselves and try not to finish the work at a rapid pace.

**4. WATER INTAKE.** Water intake levels should coincide with BE recommendations in accordance with Attachment 2, Tables A2.1. and A2.2., WBGT Stages, Temperature Ranges, and Flag Colors.

**5. PREVENTION MEASURES.** The key to preventing thermal illness and/or injury is for commanders, supervisors, and individuals at all levels to have an awareness of thermal risk factors. Any training or task involving physical exertion in a hot or cold climate should be considered a high-risk activity. Risk of illness and/or injury is based primarily upon environmental conditions, work rate, and clothing worn. When there is a thermal casualty risk, it is the commander's duty to ensure that resources are available to undertake an appropriate risk assessment and employ risk management actions. Commanders, supervisors, and workers will be familiar with AFPAM 48-151 and the contents of this wing pamphlet for all thermal stress related conditions.

TONY D. BAUERNFEIND, Col, USAF  
Commander

**ATTACHMENT 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 48-1, *Aerospace Medicine Enterprise*, 23 Aug 2011

AFPAM 10-100, *Airman's Manual*, 1 Mar 2009

AFPAM 48-151\_AFGM4, *Thermal Injury*, 7 May 2013

AFI 33-324, *Air Force Information Collections and Reports Management Program*, 6 Mar 2013

AFI 33-332, *Air Force Privacy and Civil Liberties Program*, 5 Jun 2013

AFMAN 33-363, *Management of Records*, 1 Mar 2008

AFI 36-2905, *Fitness Program*, 1 Jul 2010

TB MED 508, *Prevention and Management of Cold-Weather Injuries*, 1 Apr 2005

Threshold Limit Values and Biological Exposure Indices, published by the American Conference of Governmental Industrial Hygienists.

***Adopted Forms***

AF Form 847, *Recommendation for Change of Publication*

***Abbreviations and Acronyms***

**ABU**—Airman Battle Uniform

**AFSAS**—Air Force Safety Automated System

**BE**—Bioenvironmental Engineering

**BDU**—Battle Dress Uniform

**CC**—Commander

**DSN**—Defense Switching Network

**F**—Fahrenheit

**FRL**—Frostbite Risk Level FSO - Flight Surgeon's Office FSS - Force Support Squadron

**MOCC**—Maintenance Operations Control Center

**NOTAMS**—Notices to Airmen

**OPR**—Office of Primary Responsibility

**PT**—Physical Training

**PTL**—Physical Training Leader

**SOAMDS**—Special Operations Aerospace Medicine Squadron

**SOMDG**—Special Operations Medical Group

**SOW**—Special Operations Wing



**WBGT**—Wet Bulb Globe Temperature.

***Terms***

**Acclimatization**—A series of physiological adjustments, which occur when an individual is exposed to a hot or cold climate. In simple terms, this is considered a break-in period to help personnel slowly adjust to hot and cold environments.

**Cold Injury**—Cold environments pose a threat to the individual if they exceed the capacity of the body's thermo-regulatory response mechanisms. The main hazards are *hypothermia* associated with a fall in the body's core temperature and/or *tissue damage* that falls under the broad headings of freezing cold injury (FCI) and non-freezing cold injury (NFCI). For the purpose of this AFPAM the term 'Cold Injury' is all embracing and applies to an individual who becomes incapacitated as the result of a drop in core body temperature, FCI or NFCI.

**Heat Illness**—Traditionally heat illness has been divided into *heat exhaustion* and *heat stroke*. In practice the division is difficult to define, thus, for the purpose of this AFPAM the term 'Heat Illness' is all embracing and applies to an individual who becomes incapacitated as the result of a rise in core body temperature.

**Heat Stress**—The net heat load to which a worker may be exposed from the combined contributions of metabolic cost of work, environmental factors (air temperature, humidity, air movement, etc.) and clothing. In simple terms, heat stress is the body burden from these three categories above.

**Heat Stress Posting**—Visual notification of heat stress flag conditions, work rest cycles and or special personal protective equipment.

**May**—Indicates an acceptable or satisfactory method of accomplishment.

**Should**—Indicates a preferred method of accomplishment.

**Thermal Stress**—The common term used to cover both heat and cold stress.

**Wet Bulb Globe Temperature**— The WBGT is an instrument used to measure the heat stress index.

**Will**—Indicates a mandatory requirement and is also used to express a declaration of intent, probability, or determination.

**Work/Rest Cycle**—A guidance schedule for personnel to ensure adequate rest breaks are taken to avoid heat stress disorders.

## ATTACHMENT 2

### HOT WEATHER GUIDANCE

**Table A2.1. Guidelines for Average Acclimatized Personnel.**

Heat Cat/Flag	WBGT	EASY WORK		MODERATE WORK		HARD WORK	
		Work Rest Cycle	Water Intake	Work Rest Cycle	Water Intake	Work Rest Cycle	Water Intake
1	78 - 81.9	No Limit	0.5	No Limit	0.75	40/20 min	0.75
2	82 - 84.9	No Limit	0.5	50/10 min	0.75	30/30 min	1.0
3	85 - 87.9	No Limit	0.75	40/20 min	0.75	30/30 min	1.0
4	88 - 89.9	No Limit	0.75	30/30 min	0.75	20/40 min	1.0
5	> 90	50/10 min	1.0	20/40 min	1.0	10/50	1.0

**Table A2.2. Guidelines for Average Un-acclimatized Personnel.**

Heat Cat/Flag Color	WBGT (F)	EASY WORK		MODERATE WORK		HARD WORK	
		Work Rest Cycle	Water Intake Qt/hr <sup>a</sup>	Work <sup>b</sup> Rest <sup>c</sup> Cycle	Water Intake Qt/hr	Work Rest Cycle	Water Intake Qt/hr
1	78 - 81.9	No Limit	0.5	50/10 min	0.75	30/30 min	0.75
2	82 - 84.9	No Limit	0.5	40/20 min	0.75	30/30 min	1.0
3	85 - 87.9	No Limit	0.75	30/30 min	0.75	20/40 min	1.0
4	88 - 89.9	No Limit	0.75	20/40 min	0.75	10/50 min	1.0
5	> 90	40/20 min	1.0	10/50 min	1.0	Not allowed	Not applicable

**a.** For all 3 work rates, individual water requirement may vary by +/- 0.25 qt/hr.

**b.** When performing work/exercise with ground crew ensemble, fire-fighting gear or other similar restrictive or impermeable clothing arrangements should be made for remote site measurement of the WBGT and 10°F added to the measurement before using tables 3 or 4. Add 15 degree WBGT if also wearing combat armor.

**c.** Rest means minimal physical activity, i.e. sitting or standing, accomplished in the shade if possible.

**Table A2.3. WBGT Adjustments for Clothing.**

Clothing Item	WBGT Adjustment
ABU	+1
Combat armor (+ABU)	+5 (+6)
Fire-fighting gear or similar clothing	+10
Fire-fighting gear + combat armor	+12
MOPP 2	+5

MOPP 4	+10
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**Table A2.4. Guide to Determination of Workload.**

EASY WORK	MODERATE WORK	HARD WORK
<ul style="list-style-type: none"> <li>• Walking on hard surface @ 2.5 mph with <math>\leq 30</math> lb load</li> <li>• Weapon Maintenance</li> <li>• Manual of Arms</li> <li>• Marksmanship Training</li> <li>• Drill and Ceremony</li> </ul>	<ul style="list-style-type: none"> <li>• Walking on hard surface @ 3.5 mph with <math>&lt; 40</math> lb load</li> <li>• Walking loose sand @ 2.5 mph with no load</li> <li>• Patrolling</li> <li>• Low crawl, high crawl</li> <li>• Defensive position construction</li> </ul>	<ul style="list-style-type: none"> <li>• Walking on hard surface @ 3.5 mph with <math>\geq 40</math> lb load</li> <li>• Walking on loose sand @ 2.5 mph with load</li> </ul>

### ATTACHMENT 3

### COLD WEATHER GUIDANCE

Figure A3.1. Wind Chill Temperature Index.

Wind (mph)	Temperature (°F)																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-15	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-6	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

**Note: Frostbite times are for exposed cheek skin.**

**Frostbite Times ►**

**30 minutes**

**10 minutes**

**5 minutes**

#### FROSTBITE RISK

LOW – freezing is possible, but unlikely (WHITE)

HIGH – freezing could occur in 10-30 minutes (LIGHT GREY)

SEVERE – freezing could occur in 5-10 minutes (MEDIUM GREY)

EXTREME – freezing could occur in <5 minutes (DARK GREY)

**Figure A3.2. Time in Minutes Until the Occurrence of Cheek Frostbite in the Most Susceptible 5 Percent of Personnel.**

Wind Speed (mph)	Air Temperature (°F)											
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	>120	>120	>120	>120	31	22	17	14	12	11	9	8
10	>120	>120	>120	28	19	15	12	10	9	7	7	6
15	>120	>120	33	20	15	12	9	8	7	6	5	4
20	>120	>120	23	16	12	9	8	8	6	5	4	4
25	>120	42	19	13	10	8	7	6	5	4	4	3
30	>120	28	16	12	9	7	6	5	4	4	3	3
35	>120	23	14	10	8	6	5	4	4	3	3	2
40	>120	20	13	9	7	6	5	4	3	3	2	2
45	>120	18	12	8	7	5	4	4	3	3	2	2
50	>120	16	11	8	6	5	4	3	3	2	2	2

Note: Wet skin could significantly decrease the time for frostbite to occur.

**FROSTBITE RISK**

LOW – freezing is possible, but unlikely (WHITE)

HIGH – freezing could occur in 10-30 minutes (LIGHT GREY)

SEVERE – freezing could occur in 5-10 minutes (MEDIUM GREY)

EXTREME – freezing could occur in <5 minutes (DARK GREY)

**Table A3.1. ORM Working Practice Guidance in Cold Environment.**

Frostbite Risk	Required Precautions and Hourly Work/Warming Cycle
<b>Low</b>	<ul style="list-style-type: none"> <li>• Recommended work/rest cycle: 50 minutes work/10 minutes warming</li> <li>• Increase surveillance with self and buddy checks.</li> <li>• Wear appropriate layers and wind protection for the work intensity.</li> <li>• Cover exposed flesh if possible.</li> <li>• Wear vapor barrier boots below 0°F.</li> <li>• Provide warming facilities below 20°F.</li> <li>• Avoid sweating.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>• Recommended work/rest cycle: 40 minutes work/20 minutes warming</li> <li>• Mandatory buddy checks every 20–30 minutes.</li> <li>• Wear appropriate layers and APECS. Protect head, face and hands.</li> <li>• Cover exposed flesh.</li> <li>• Wear vapor barrier boots below 0°F.</li> <li>• Provide warming facilities.</li> <li>• Avoid sweating.</li> </ul>

<b>Severe</b>	<ul style="list-style-type: none"><li>• Recommended work/rest cycle: 30 minutes work/30 minutes warming</li><li>• Mandatory buddy checks every 10 minutes.</li><li>• Wear appropriate layers and APECS or cold weather parka. Protect head, face and hands.</li><li>• Wear vapor barrier boots.</li><li>• Provide warming facilities.</li><li>• Work groups of no less than two personnel.</li><li>• No exposed skin.</li><li>• Stay active.</li><li>• Avoid sweating.</li></ul>
<b>Extreme</b>	<ul style="list-style-type: none"><li>• Mission critical work only due to extreme risk.</li><li>• Keep task duration as short as possible.</li><li>• Wear appropriate layers, cold weather parka and wind protection. Protect head, face and hands.</li><li>• Wear vapor barrier boots.</li><li>• Provide warming facilities.</li><li>• Work groups of no less than two personnel.</li><li>• No exposed skin.</li><li>• Stay active.</li><li>• Avoid sweating.</li></ul>

**Notes:** Work/Rest (W/R), Vapor Barrier (VB), All Purpose Environmental Clothing System (APECS.)

## ATTACHMENT 4

### TRAINING AIDS

**Table A4.1. Symptoms and First Aid Treatment for Heat Stress.**

Illness	Signs and Symptoms	First Aid
Heat Syncope	Fainting when standing erect and immobile in the heat.	Remove to cool area. Allow to recline and provide cool water. Recovery will be prompt and complete.
Heat Cramps	Active sweating, muscle cramps.	Remove to cool area. Massage extremities. Contact medical facility.
Heat Exhaustion	Profuse sweating, headache, weakness, and nausea; skin cool and moist.	Remove to cool area. Elevate feet. Loosen clothing and apply wet cloths. Evacuate to medical facility.
Heatstroke-Medical Emergency	High body temperature; skin dry and hot; unconsciousness, convulsions, or delirium.	<b>THIS IS A MEDICAL EMERGENCY.</b> Call medical facility first. Lower body temperature immediately. Remove clothing, immerse in water, if available. Otherwise, sprinkle with water and fan to increase evaporation, massage extremities and trunk. Move to medical facility. Continue cooling measures during transportation.

**Table A4.2. Symptoms and First-Aid Treatment for Cold Injuries.**

Illness	Symptoms	First Aid / Prevention Measures
Muscle Injuries	Muscle and tendon tears	Active warm up, sufficiently energetic and prolonged to ensure that the whole body is warm.
Shivering	Self-explanatory; reduced performance in manual skills that require steadiness.	Remove individual from environment; Provide adequate warming during rest periods; Proper selection/use of cold weather gear
Raynaud's Disease/Syndrome	Cold at a severity that does not affect normal people may cause severe arterial vasoconstriction, most commonly affecting the fingers, in individuals with Raynaud's	Remove individual from environment; Provide adequate warming during rest periods; Proper selection/use of cold weather gear; Chemical hand warmers may be necessary
Reduced manual dexterity	The fingers are much less sensitive in the cold with subsequent loss of manual dexterity.	Remove individual from environment; Provide adequate warming during rest periods; Proper selection/use of cold weather gear
Loss of normal activity/functions	Making simple mistakes, misinterpret sights or sounds, reduced coordination, visual acuity, general awareness and slowed reflexes. May even cause hallucinations, particularly at altitude.	Remove individual from environment; Provide adequate warming during rest periods; Proper selection/use of cold weather gear
Non Freezing Cold Injury (i.e. Trench Foot)	The affected areas are initially cold and numb. Trench foot gives the sensation of "walking on cotton wool." Joint stiffness and affected areas are cold, swollen, and blotchy pink-purple or blanched.	Remove the person from the cold environment and allow the affected body part to rewarm spontaneously. After rewarming, the feet may become hyperemic, hot, and red with paraesthesia or pain, often similar to electric shocks.

Frostnip	Painful exposed skin blanches and loss of sensation but remains pliable.	The affected area should be warmed by placing it in the armpit or under clothing. Tingling is followed by hyperemia and within a few minutes sensation is restored and normal activity can be resumed.
Frostbite	Tissues are hard, insensitive, and white or mottled (usually affecting the feet, hands, ears, nose, and cheeks).	No attempt should be made to thaw frostbite if there is any chance of the affected area becoming re-frozen. The freeze-thaw-re-freeze cycle causes greater damage than continuous freezing. It is safer to walk on frozen feet even for 72 hours.
Hypothermia	Profound shivering, slurred speech, psychological symptoms including aggressive or withdrawn behavior, progressive reduction in the shivering response and loss of consciousness.	Remove the casualty from the cold environment. Movement must be gentle in order to avoid triggering cardiac arrest. Layers of insulating material should be placed on top of the casualty's clothing, including the head, and covered with a layer that is water and wind proof.